

DATA ENTRY AND DISPLAY CONTROL CIRCUIT

FIELD OF THE INVENTION

The present invention relates to telephone stations and more particularly to a telephone having programmable features and display screen control functions.

BACKGROUND OF THE INVENTION

Programmable telephones having a variety of features are well known. However, these telephones typically require complex arrays of control and keypad buttons to be dedicated to particular features. These telephones are typically require complex and lengthy user programming operations.

A recent improvement was disclosed in U.S. Pat. No. 4,453,040, entitled "Telephone Feature Assignment Circuit." That patent was issued on June 5, 1984 to L. W. Smith and A. L. Wolf. However, the improvement disclosed therein was limited to entry of numerical data.

The present invention discloses a novel data entry and display control circuit which allows pushbuttons to be programmed for various telephone features in response to alphanumeric data entry from a standard telephone keypad. This novel invention also discloses an arrangement for controlling both the positioning of the cursor on a display screen, and other display functions, from a standard telephone keypad.

SUMMARY OF THE INVENTION

In accordance with the present invention a data entry and display control circuit is provided for use in a telephone which includes a plurality of switches, each being operative to successively provide a plurality of appearances of a switch signal, and a keypad being operative to provide a plurality of character signals. The telephone is operative to provide a plurality of features, each in response to operation of a different switch. The data entry and display control circuit comprises storage means having a plurality of storage locations and it is operative to store a plurality of feature codes, each being associated with one of the plurality of features.

A microprocessor is also included and it is connected between the switches and the storage means. The microprocessor is operative in response to the occurrence, in succession for each switch, of a first appearance of predetermined duration of the switch signal, at least one pair of character signals having a predetermined relationship to one of the feature codes, and a second appearance of predetermined duration of the switch signal. The microprocessor then stores in the storage means a data code associating the switch with the programmed feature code, whereby each switch is programmed to operate an associated feature.

A display screen is also included and it is connected to the microprocessor. The display screen includes a positionable cursor. The microprocessor is operative in response to predetermined pairs of character signals to vary the position of the cursor, and it is further operative in response to other predetermined pairs of character signals to delete or insert data as defined by a subsequent pair of characters. Such deletions and insertions are made at the location indicated by the cursor.

DESCRIPTION OF THE DRAWINGS

FIG. 1 of the accompanying drawing is a schematic diagram of a data entry and display control circuit in accordance with the present invention.

FIG. 2 is a Table showing an algorithm of keyboard actuations which represent alpha-numeric characters and cursor control.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the accompanying drawing the data entry and display control circuit of the present invention is shown. Modern electronic telephones have many features, each of which can be executed in response to operation of an associated pushbutton. Such features often include speed calling, last number redial and station lock. The data entry and display control circuit of the present invention discloses an arrangement for data entry and programming of selected pushbuttons to execute assigned features. Upon completion of such programming the assigned feature can be executed by momentary operation of the push-button assigned to it. This invention also discloses an arrangement for display control in response to keypad signals.

This circuit includes processing unit 100 connected to audible and visual display circuit 200, switch circuit 300, diode network 400 and resistor network 500. Also keypad 600 is connected to diode network 400 and display screen 700 is connected to processing unit 100. This display screen is typically a cathode ray tube (CRT).

Processing unit 100 includes microprocessor 101 connected to memory 102. Display circuit 200 includes light emitting diodes (LEDs) 201a-201n, resistors 202a-202n and transducer 203. Switch circuit 300 includes switches 301a-301n, each of which is connected to ground when an associated pushbutton is depressed. Switches 301a-301n are also connected to a +5 volt supply via resistors 302a-302n, respectively. Each of these switches is further connected to microprocessor 101 via an associated one of leads 303a-303n. Diode network 400 includes seven protection diodes connected to keypad 600 via four row (R1-R4) and three column (C1-C3) leads. These diodes protect microprocessor 101 from extraneous high voltage signals at keypad 600.

Keypads, transducers, display screens, microprocessors and memories are old and well known. Keypads typically include four rows and three columns of pushbuttons. Each pushbutton connects an associated row and column lead to ground when it is operated. Resistor network 500 includes seven resistors connected to the +5 volt source. Each resistor is further connected to an associated diode in diode network 400.

To program a feature, e.g. station lock, to a particular pushbutton, a selected pushbutton is depressed and held depressed for a predetermined time, e.g. three seconds. This causes the associated switch, e.g. 301a, to close and connect an associated lead, e.g. 303a, to ground. Microprocessor 101 then detects the resultant first appearance of a logic level 0 switch signal on lead 303a. If this signal is present for the required predetermined time microprocessor 101 determines it to be a feature programming request. If this signal is only momentarily present, e.g. less than 1.5 seconds, microprocessor 101 determines it to be a feature execution request.